

AGS Polarimeter in Run 13 (first results)

AGS CNI Polarimeter 2013

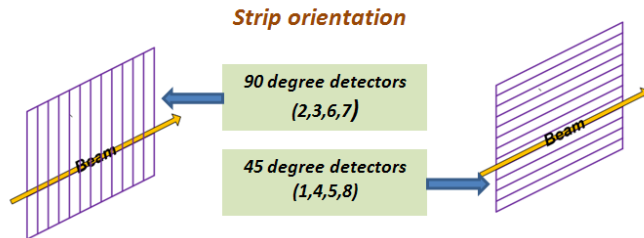
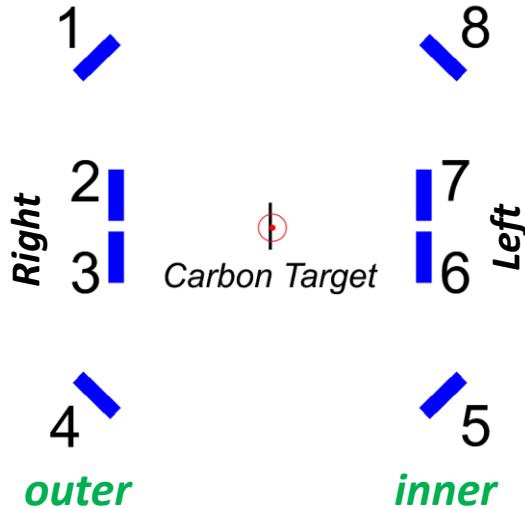
3 different detector types:

1,8 - Hamamatsu, **slow** preamplifiers, $L = 51$ cm

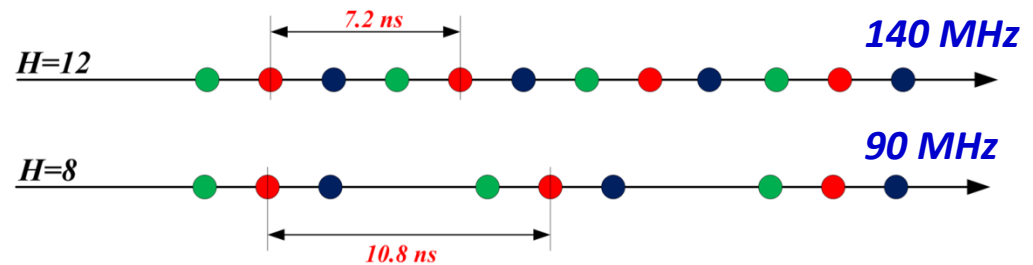
2,7 - BNL 2mm, **slow** preamplifiers, $L = 30$ cm

3,6 - BNL 1 mm, **slow** preamplifiers, $L = 30$ cm

4,5 - Hamamatsu, **slow** preamplifiers, $L = 51$ cm



90 MHz sampling rate (derived from $H=8$)



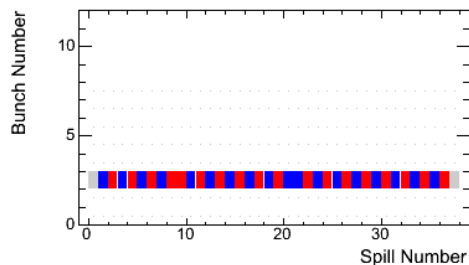
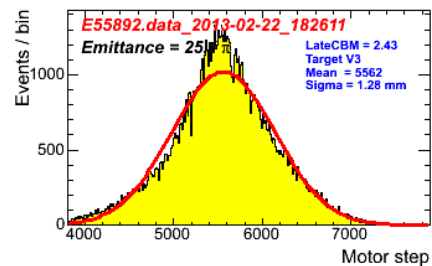
The biggest concern is a 6.5 ns gap between “blue” and “green” measurements. Measured amplitude may be strongly smeared if the signal is not wide enough.

High Intensity Run 55892 ($I = 2.4 \times 10^{11}$)

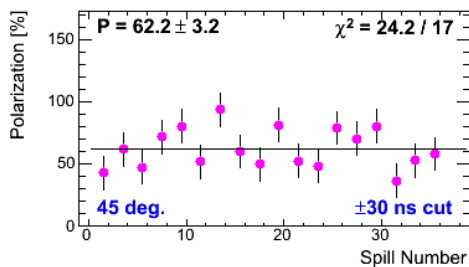
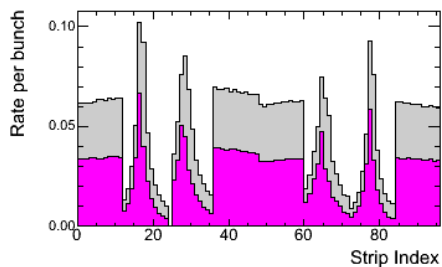
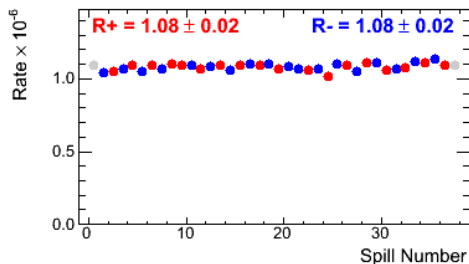
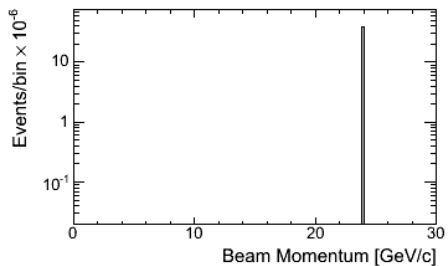
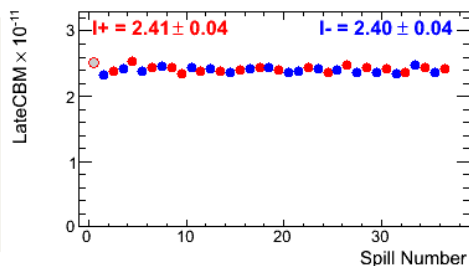
Fri Feb 22 18:26:18 2013

Fri Feb 22 18:29:00 2013

Run 55892 V3 $I=2.41$ Stat=38.9 (41.4) $P = 63.3 \pm 2.9\%$

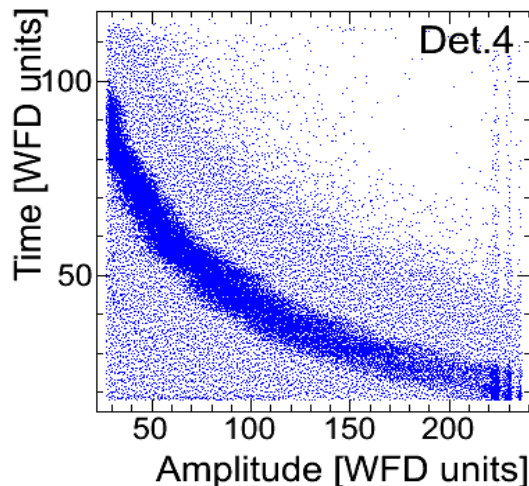
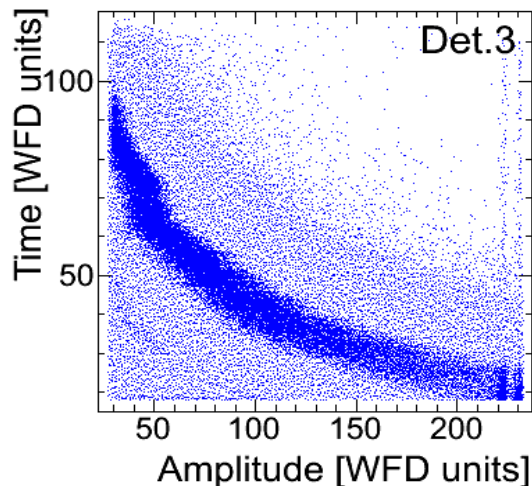
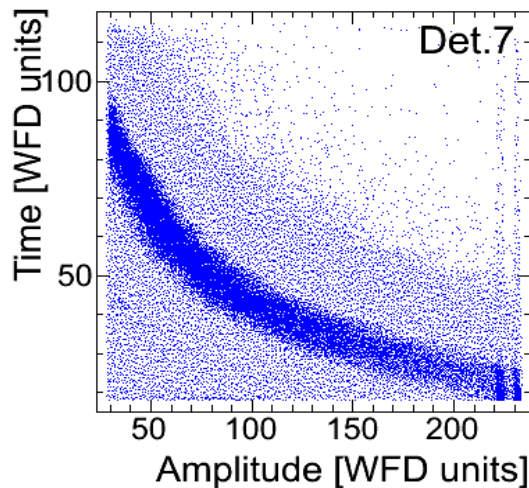
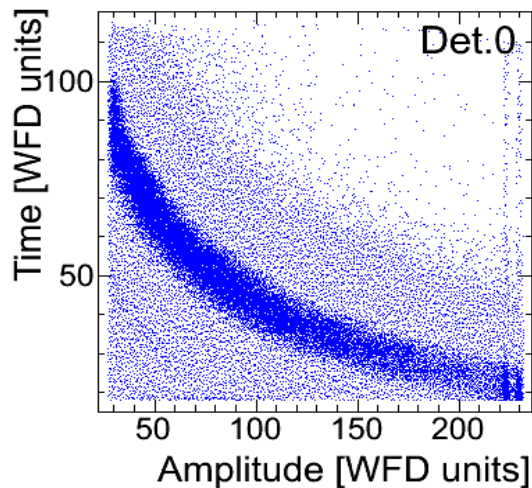


Detectors	Stat.	Polar.	(no corr.)
All	9.9	65.0 ± 2.1	(60.8 ± 2.2)
90deg	3.6	63.3 ± 2.9	(59.6 ± 3.0)
90degUp	1.7	58.8 ± 4.1	(54.8 ± 4.3)
90degDn	1.9	67.5 ± 4.0	(64.1 ± 4.1)
45deg	6.3	66.7 ± 3.1	(62.2 ± 3.2)
45degUp	3.1	68.0 ± 4.4	(63.4 ± 4.5)
45degDn	3.2	65.7 ± 4.3	(61.2 ± 4.4)
Det.Mask=0xFF		R.C.=1.00	



High Intensity Run 55892 ($I = 2.4 \times 10^{11}$)

AGS: Run 55892 45deg.



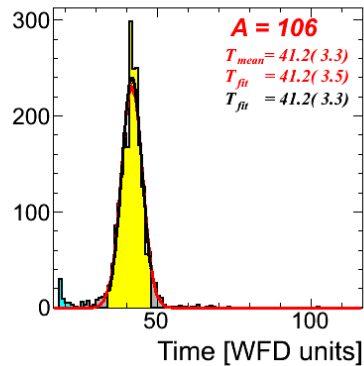
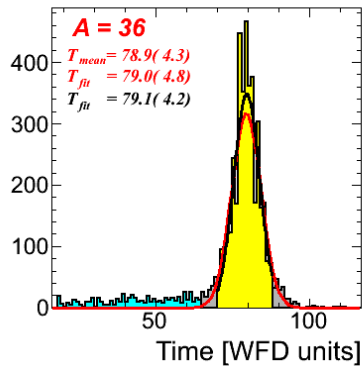
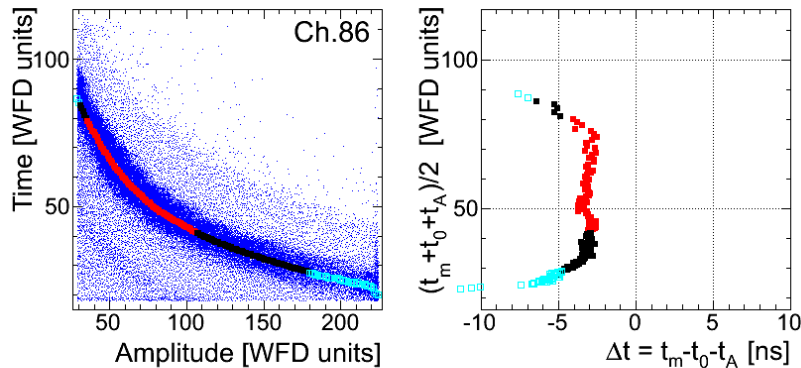
45 degree detectors:

- Reasonably good bananas.
- Induced noise contribution is much smaller than in Run12

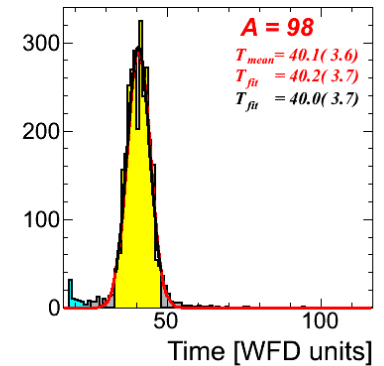
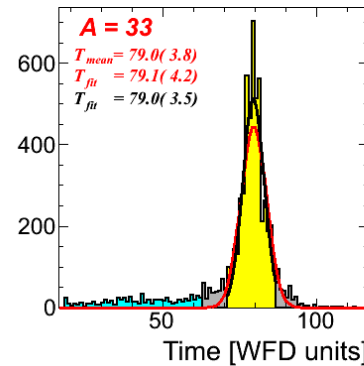
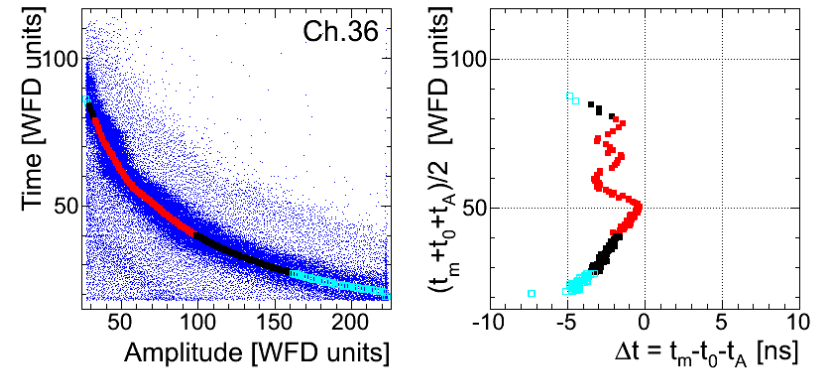
High Intensity Run 55892 ($I = 2.4 \times 10^{11}$)

45 degree strips:

AGS: Run 55892 Det#8 Chan#87



AGS: Run 55892 Det#4 Chan#61



Inner up detector:

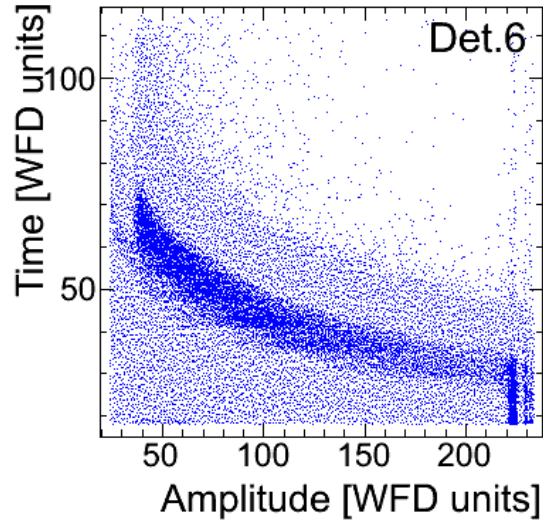
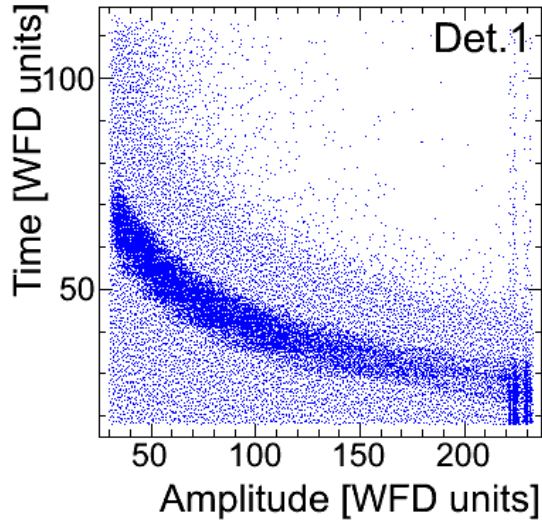
No induced noise contribution

Outer down detector:

Visible induced noise contribution

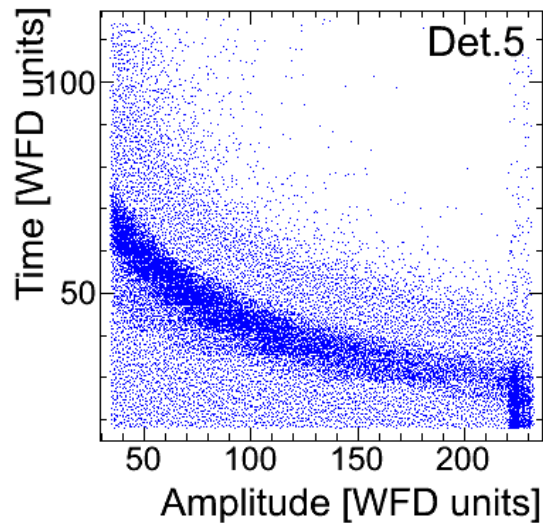
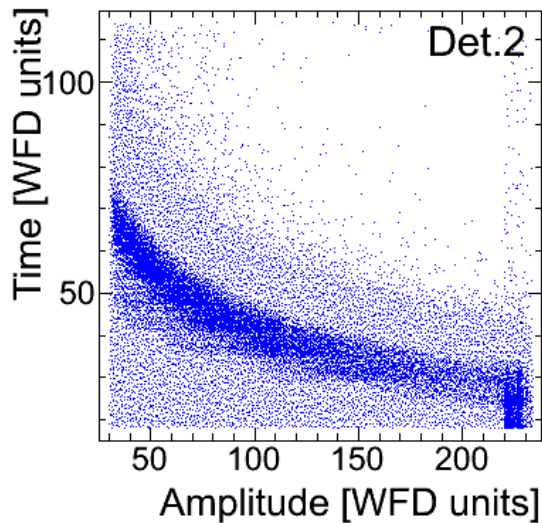
High Intensity Run 55892 ($I = 2.4 \times 10^{11}$)

AGS: Run 55892 90deg.



90 degree detectors:

- *Smeared bananas.*
- *The similar pictures at low intensity*
- *Induced noise contribution is not seen*



High Intensity Run 55892 ($I = 2.4 \times 10^{11}$)

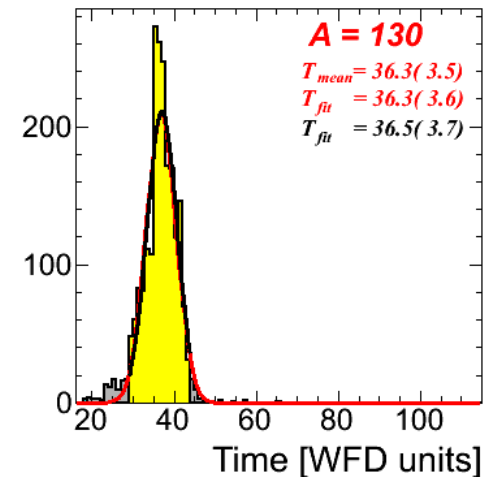
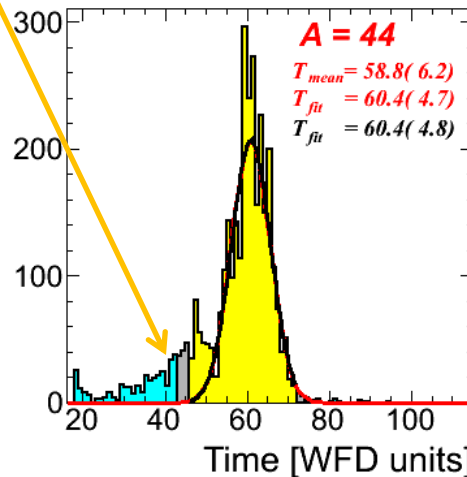
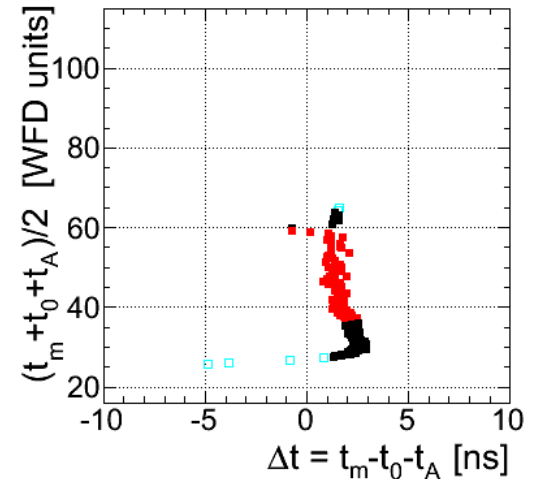
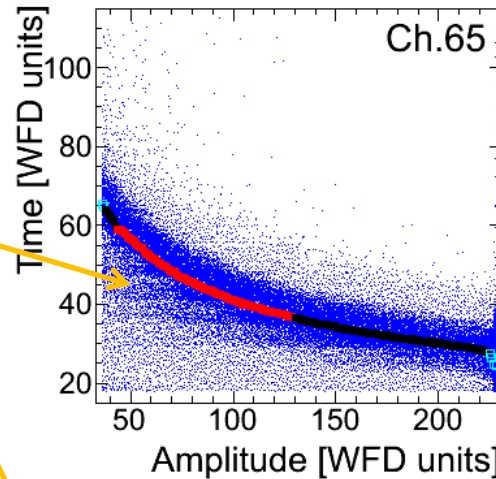
90 degree strip:

AGS: Run 55892 Det#6 Chan#30

*It might be an indication
of too narrow signal*



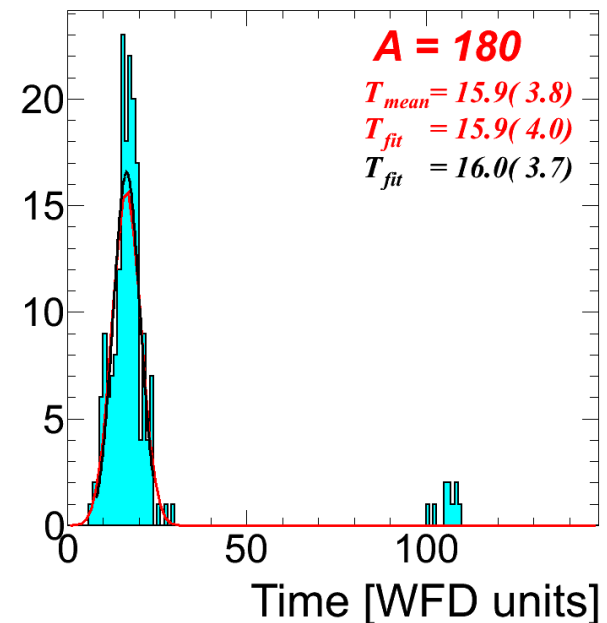
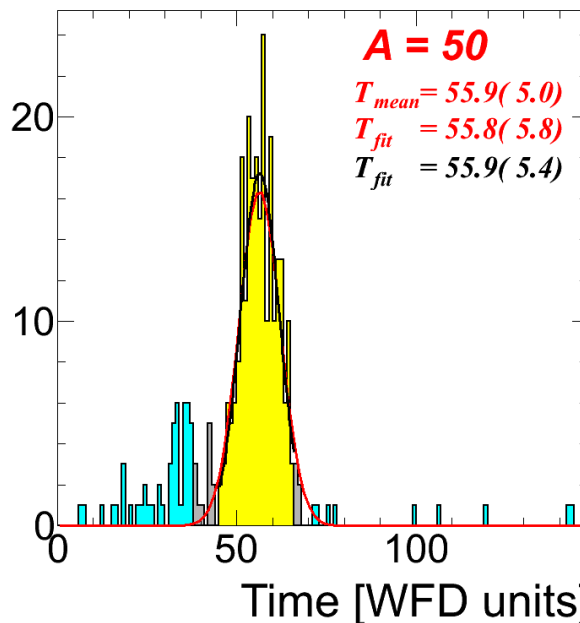
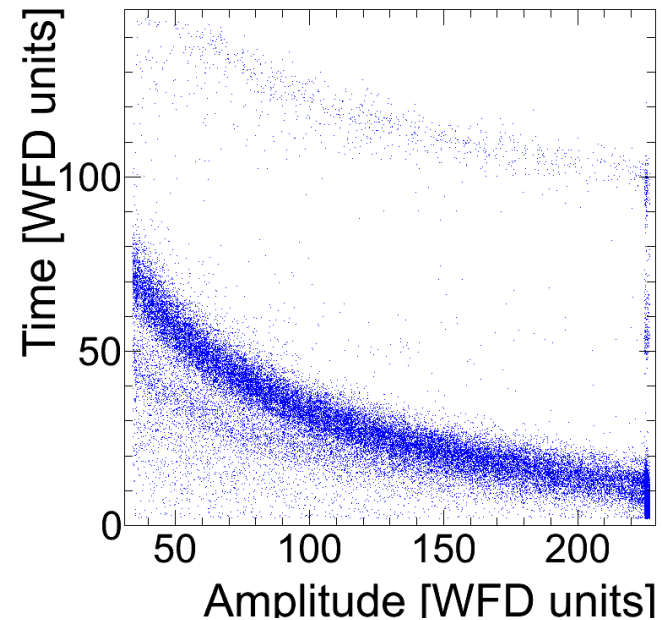
*Measured polarization
might be underestimated*



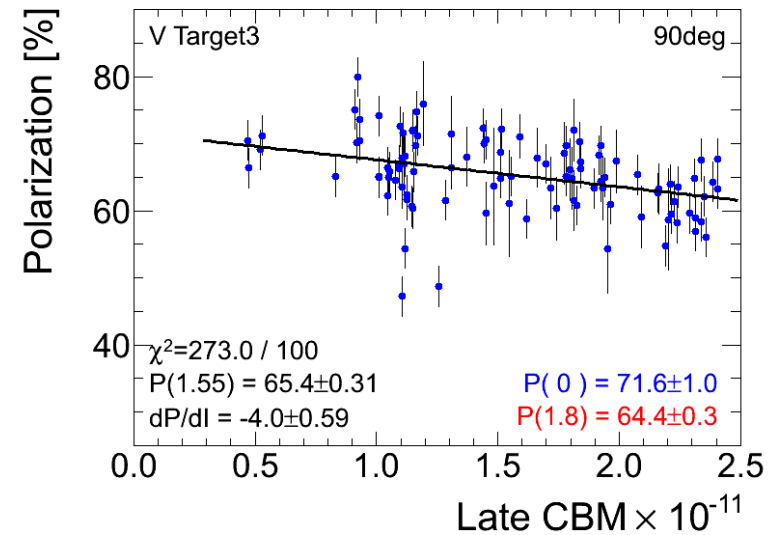
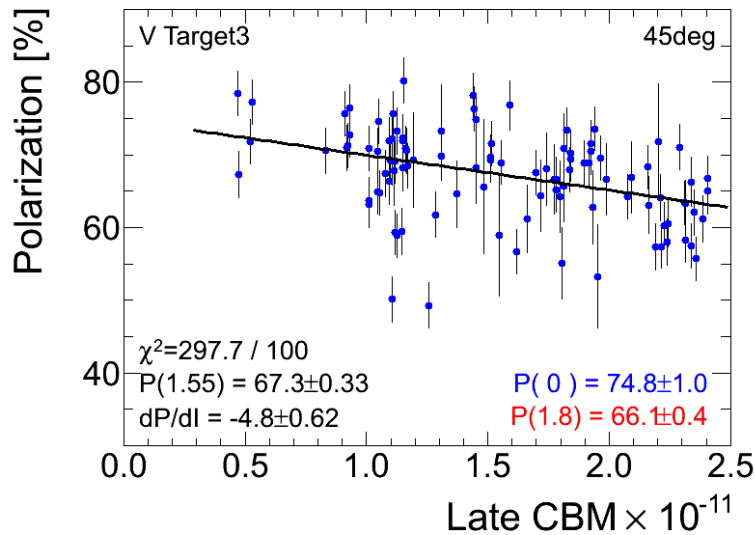
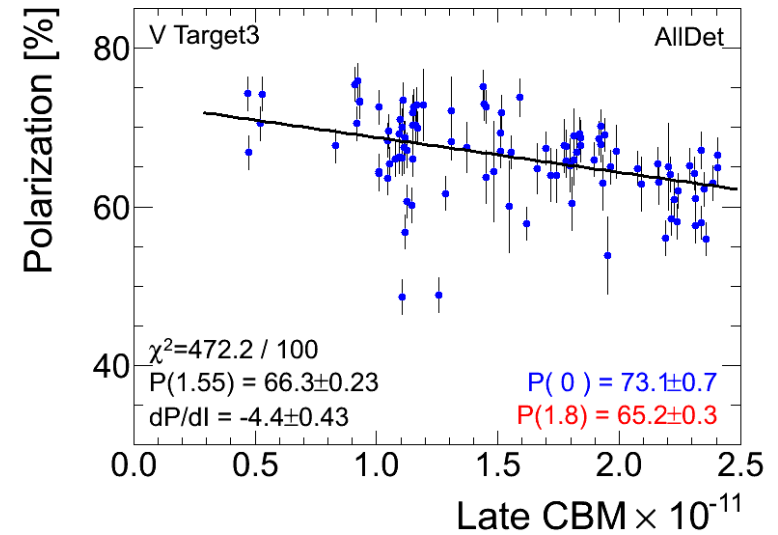
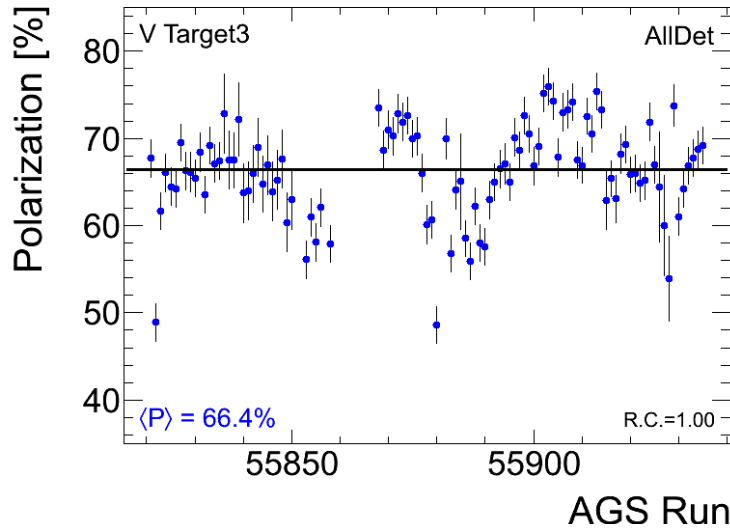
Run 55892 ($I = 2.4 \times 10^{11}$) **140 MHz samplina**

Strip 65 (#30):

- *Banana smearing gone*
- *But it is clearly split*
- *Perhaps, this split is also seen at 90 MHz*
- *There are problems with WFD bunch and Carbon signal synchronization.*



Runs 55821-55940 Target V3

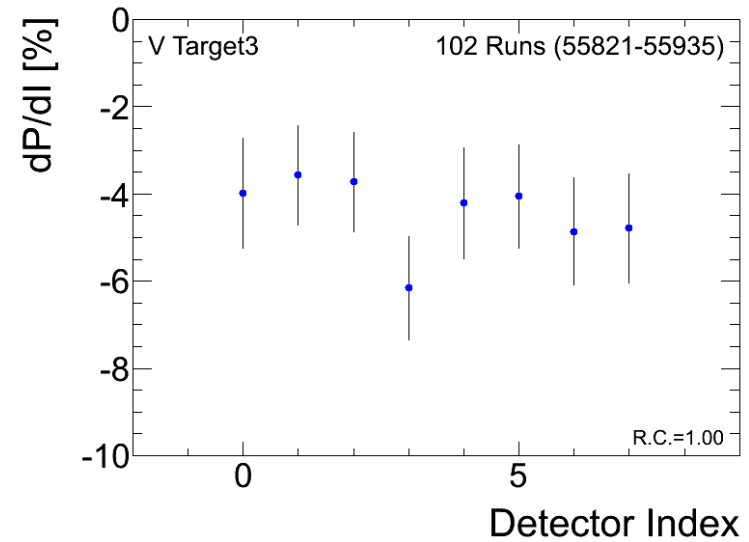
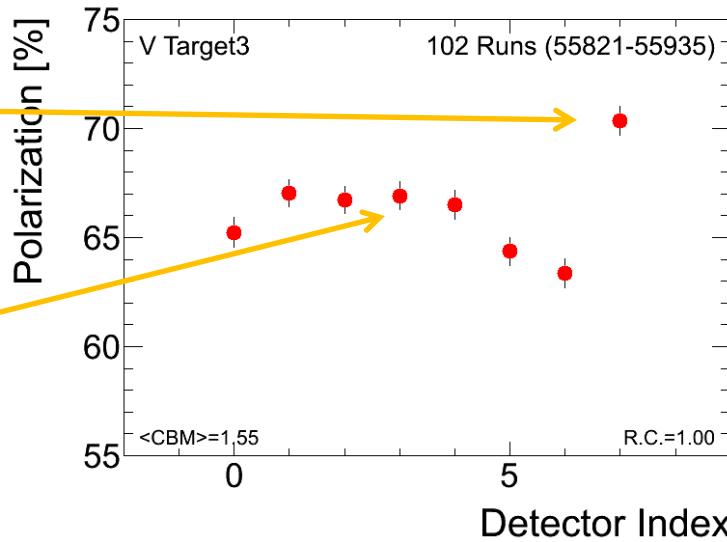


- 45 deg. Detectors give a few percent larger polarization than 90 deg. Detectors
- No visible difference in the polarization slope

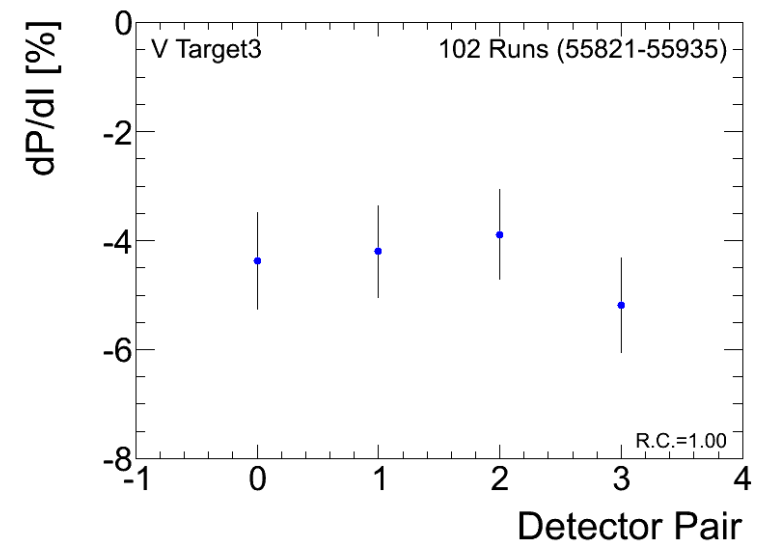
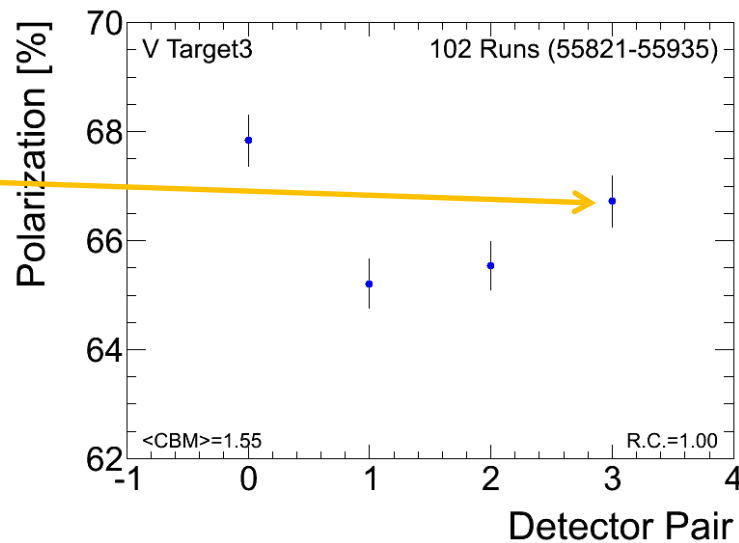
Runs 55821-55940 Target V3

Detector 7 (#8) gives larger polarization. Similar to Runs 11 and 12

Should be interpreted with caution



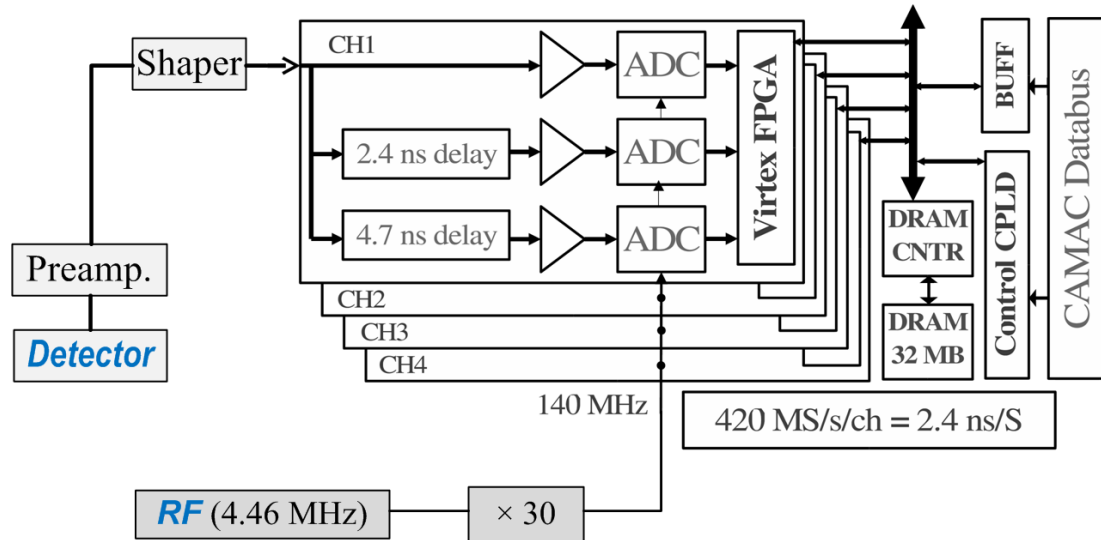
We may expect that detector pair 3 (lower Hamamatsu) gives most reliable result



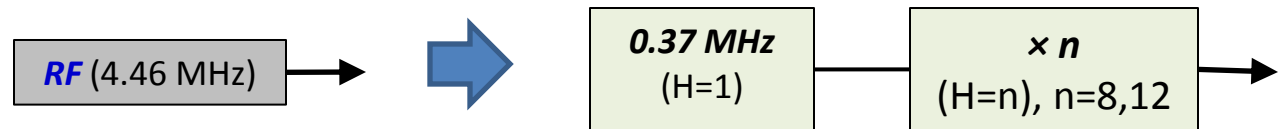
- 45 deg. Detectors give a few percent larger polarization than 90 deg. Detectors
- No visible difference in the polarization slope

Sampling Rate Control

Run 12:

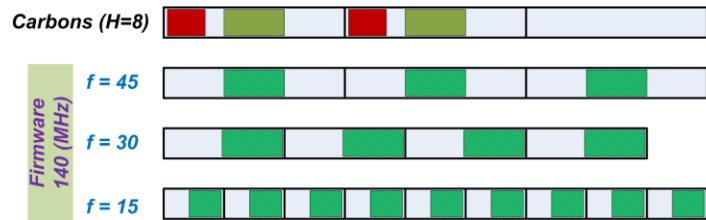


Run 13:
(new RF system)

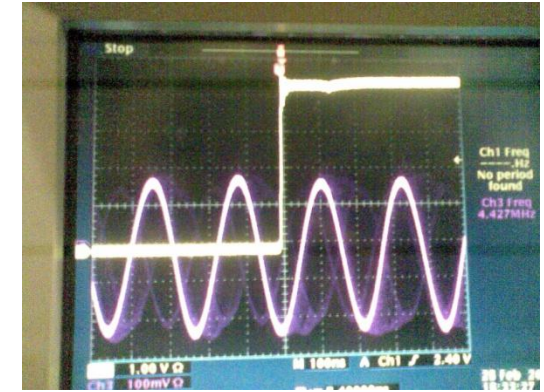
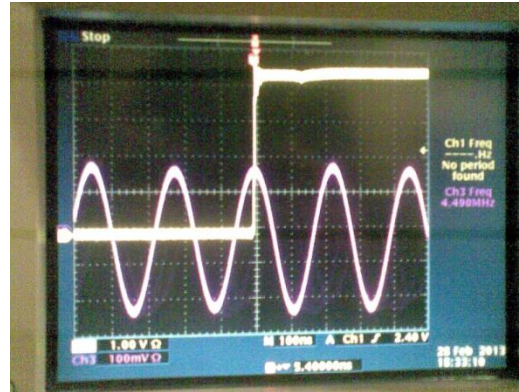


n may be selected from the
pet page

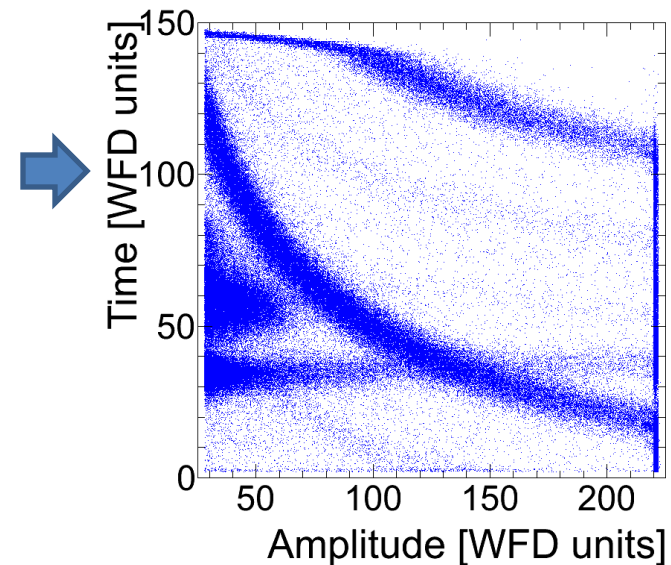
An attempt to use $H=12$ sampling



*There may be a phase shift 112 ns
(spill number dependent) between
 $H=12$ harmonic and beam*

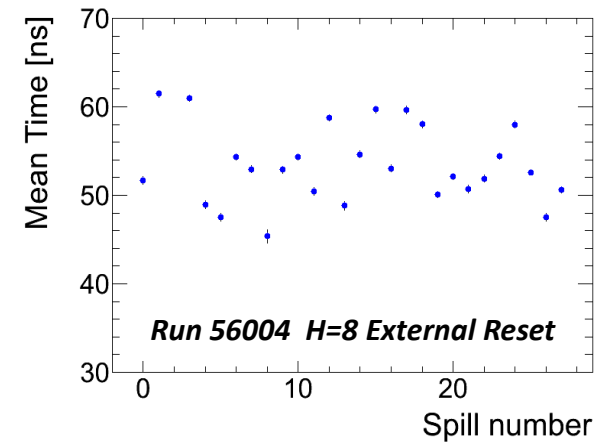
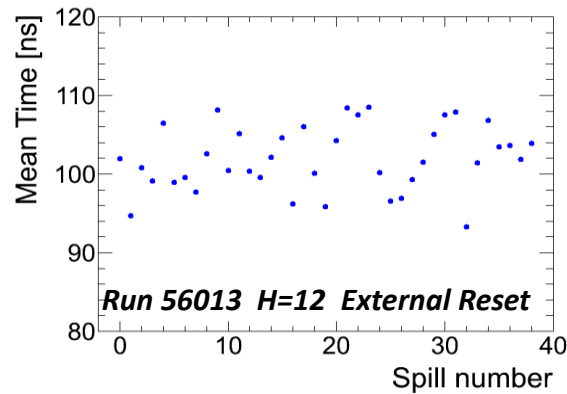
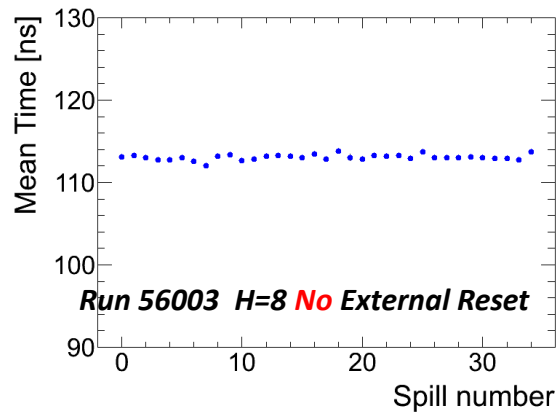


Run 55820 ($H=12$) Ch. 84
Two phases are superimposed



Possible solution of the problem

1. RF group provides synchronization. 2.5 ns jitter (spill to spill) is expected.
A first try was not fully succesful.



2. Suggested by Igor.
Change frequency multiplier (in our module) from 30 to 15 and use RF harmonics 16 or 24.

Summary

- *Hamamatsu detectors perform well with $H=8$ (90 MHz) sampling*
- *There are some issues with 90 degree (BNL) detectors:*
 - *banana smearing with $H=8$ sampling*
 - *banana split with $H=12$ sampling**but polarization measurement is usable.*
- *There are still unsolved phase synchronization problems with using $H=12$ (140 Mhz) sampling*